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EXAMINER	
OLSEN, LIN B	

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3661	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/814,707	RICHEY, RONALD K.	
	Examiner	Art Unit	
	Lin B. Olsen	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *1,2,10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/30/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 3/30/2004 was filed before the mailing date of the First Office Action. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

The abstract of the disclosure is objected to because the word "ware" on line 4 of page 14 should be "wear". Correction is required. See MPEP § 608.01(b).

Claim Objections

Claims 1, 2, 10 and 11 are objected to because of the following informalities:

Regarding claim 1, the term "said stop position" has no antecedent basis; the claim will be examined as if it recited "said rudder stop position".

Regarding claim 2, on line 21, the word "at" is omitted between the words "stopped" and "a".

Claims 10 and 11 are objected to because of the following informalities: the term "said second set rudder position" has no antecedent basis since at line 11 of claim 10, the term "a set rudder position" was used; the claim will be examined as if it recited "said set rudder position".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **1-4 and 14-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,107,424 to Bird et al. (hereafter referred to as Bird) in view of U.K. Published Patent Application 2 222 971 to Jones & Shipman (hereafter referred to as Jones). Bird teaches an automatic piloting system for a marine vessel that incorporates control of sets of configurable hydraulic pumps. Jones teaches a system for controlling the positioning of a grinding wheel having a large mass and momentum – speed of positioning and a need for precise positioning are issues resolved by Jones. Bird controlled the rudder and would have been motivated to survey the control system

art when controlling the mass of a rudder to limit overshoot and improve the accuracy of positioning.

Regarding Independent **claim 1** and **claim 14** for the apparatus to perform the method of claim 1, " A method for positioning a rudder of a ship wherein the rudder is driven by a rudder drive system in accordance with a rudder error determined by the difference between a selected rudder position provided by a rudder order from an autopilot or helm and a rudder position provided by a rudder repeatback signal," is applicant's acknowledged prior art as described in the background of the invention. "the rudder drive system having a rudder drive system turn off at a set rudder position," reads on the purpose of an autopilot - to control the rudder, further it reads on Bird col. 15, lines 0-10. "comprising the steps of:

determining rudder stop position after said rudder drive system is turned off;

comparing said stop position to said selected rudder position to establish a rudder stop error

resetting said set rudder position when said rudder stop error exceeds a predetermined position tolerance. – Bird does not change the control sequence in this way, but Jones manages the control of the grinding wheel in the same manner. At page 3, step d) Jones generates a signal to stop the motion of the wheel. At steps e) and f) Jones measures the difference between the actual stop position and the desired stop position and at step g) the remembered desired stop position is changed based on the difference in step f). It would have been obvious to one of ordinary skill in the art at the

time of the invention to survey the control system art for an improved means of controlling the mass of a rudder to limit overshoot and improve the accuracy of positioning. Jones is in the control system art and provides a known technique to improve a similar device in the same way.

Regarding **claims 2 and 15**, which are dependent on claim 1 and 14 respectively, wherein said resetting step includes the steps of:

decreasing said set rudder position when said rudder stop error indicates that said rudder has stopped short of said rudder order;

and increasing said set rudder position when said rudder stop error indicates that said rudder has stopped a position that exceeds said rudder order. –In Jones, the grinding wheel is lowered quickly to the datum position (set rudder position), which is when the STOP command is given. The grinding wheel thereafter travels an inertia distance, (rudder stop error) which is determined by the difference between the datum distance and the final stationary position (rudder order). The inertia distance (positive or negative) is added to the datum position so that the next final position will much closer to the desired point (see page 7 of Jones).

Regarding **claim 3**, which is dependent on claim 2, wherein

said decreasing step includes the steps of:

subtracting said rudder stop error from said set rudder position to provide an adjusted rudder drive system turn off; and

resetting said set rudder position to said adjusted rudder drive system turn off. – see explanation in claim 2, above where inertia distance is negative.

Regarding **claim 4**, which is dependent on claim 2, wherein

said increasing step includes the steps of:

adding said rudder stop error to said set rudder position to provide an adjusted rudder drive system turn off; and

resetting said set rudder position to said adjusted rudder drive system turn off. - see explanation in claim 2, above where inertia distance positive.

Regarding **claim 16**, which is dependent on claim 14 wherein said turn off is reset by

decreasing said turn off in accordance a difference between said set rudder stop position and said rudder stop position error when an undershoot occurs and

increasing said turn off in accordance with a sum of said set rudder stop position and said rudder stop position error when an overshoot occurs. – See explanation of claim 15 above which covers both undershoot and overshoot.

Claims **5-9** and **17-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bird and Jones as applied to claims 1-4, and 14-16 above, and further in view of U.S. Patent No. 5,331,558 to Hossfield et al. (hereafter referred to as

Hossfield). Hossfield is concerned with a marine auto pilot with an adaptive deadband feature.

Regarding **claims 5 and 17** which are dependent on claims 1 and 14 respectively, wherein said rudder drive system includes a solenoid energized at a second set rudder position, - Reads on Bird col. 14, lines 52-57 where the first stage rudder control solenoids are energized when the rudder error is 3° which is directly related to rudder position - said solenoid coupled to an hydraulic pump which is activated when said solenoid is energized, - Reads on Bird col. 4, lines 35- 43, which describes how rudder positioning pumps are controlled by solenoids - further including the steps of;

establishing an energizing frequency for solenoid burn out protection thereby providing a burn out protection frequency; Bird does not establish an energizing frequency for burn out protection, rather Bird establishes a time between successive activations of the solenoid (a deadband) to protect against burnout (col. 4, 55 – 60). It is well known that frequency is the number of occurrences of an event in a time period. Therefore, specifying burn out protection by frequency is obvious in light of specifying it by a time period.

determining when said energizing frequency exceeds said burn out protection frequency; and - Bird determines when an energizing command occurs within the deadband time (col. 4, lines 55-58).

adjusting said second set rudder position when said energizing frequency exceeds said burn out protection frequency - Bird does not specify an action based on too frequent solenoid activations, but Hossfield does change trigger points of solenoid activations to protect the solenoids (Fig 6 as explained at col. 18 line 48 through col. 20 line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to change the activation points to provide continuity in control of the ship for accurate steering.

Regarding **claim 6**, which is dependent on claim 5, wherein said second set rudder position is increased in said adjusting step. Hossfield increases the varying limit specifically when the rudder is being moved too frequently (col. 17, line 64 – col. 18, line14).

Regarding **claims 7, 8, 18 and 19**, which are dependent on claims 5 and 17 respectively, wherein solenoid energizes (hydraulic pump activations) are monitored to determine said energizing frequency in said determining step. - When monitoring the frequency of activating the hydraulic pumps that are controlled by solenoids, is the purpose, there are a finite number of identified points to monitor to determine the frequency. It is obvious to try these identified points to yield a predictable solution with a reasonable expectation for success.

Claim **9** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Bird in view of Jones as applied to claim 1 and further in view of U.S. Patent No. 4,374,423 to Kundler et al. (hereafter referred to as Kundler). Kundler is concerned with an arrangement for monitoring a rudder control system.

Regarding **claim 9**, which is dependent on claim 1, further including the steps of: monitoring rate of change of said repeatback signal; - Bird does not teach monitoring the rate of change of the rudder feedback signal, but Kundler monitors it (abstract and col. 1 lines 62-66). It would have been obvious to one of ordinary skill in the art at the time of the invention to use Kundler's rudder monitor with Bird's marine steering system to make the operator aware of problem conditions more quickly.

determining if said rate of change is within acceptable limits; and – Kundler supplies an error signal when the rate is not in acceptable limits (col. 1, lines 62-66).

providing a warning when said rate of change is not within said acceptable limits. – Kundler sounds an alarm when the rate is not acceptable for a prescribed length of time (abstract and col. 4 lines 56 – 60).

Claims **10 - 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,107,424 to Bird et al. (hereafter referred to as Bird) in view of U.S. Patent No. 5,331,558 to Hossfield et al. (hereafter referred to as Hossfield). Bird teaches an automatic piloting system for a marine vessel that incorporates control of

sets of configurable hydraulic pumps. Hossfield is concerned with a marine auto pilot with an adaptive deadband feature.

Regarding independent **claim 10**, a method for positioning a rudder of a ship wherein the rudder is driven by a rudder drive system in accordance with a rudder error determined by the difference between a selected rudder position provided by a rudder order from an autopilot or helm and a rudder position provided by a rudder repeatback signal, the rudder drive system, including a solenoid energized at a set rudder position, - Reads on Bird col. 14, lines 52-57 where the first stage rudder control solenoids are energized when the rudder error is 3° which is directly related to rudder position - said solenoid coupled to an hydraulic pump which is activated when said solenoid is energized, - Reads on Bird col. 4, lines 35- 43, which describes how rudder positioning pumps are controlled by solenoids - comprising the steps of:

establishing an energizing frequency for solenoid burn out protection thereby providing a burn out protection frequency; Bird does not establish an energizing frequency for burn out protection, rather Bird establishes a time between successive activations of the solenoid (a deadband) to protect against burnout (col. 4, 55 – 60). It is well known that frequency is the number of occurrences of an event in a time period. Therefore, specifying burn out protection by frequency is obvious in light of specifying it by a time period.

determining when said energizing frequency exceeds said burn out protection frequency; and - Bird determines when an energizing command occurs within the deadband time (col. 4, lines 55-58).

adjusting said second set rudder position when said energizing frequency exceeds said burn out protection frequency. - Bird does not specify an action based on too frequent solenoid activations, but Hossfield does change trigger points of solenoid activations to protect the solenoids (Fig 6 as explained at col. 18 line 48 through col. 20 line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to change the activation points to provide continuity in control of the ship for accurate steering.

Regarding **claim 11**, which is dependent on claim 10, wherein said second set rudder position is increased in said adjusting step. Hossfield increases the varying limit specifically when the rudder is being moved too frequently (col. 17, line 64 – col. 18, line14).

Regarding **claims 12 and 13**, which are dependent on claim 10, wherein solenoid energizes (13 – hydraulic pump activations) are monitored to determine said energizing frequency in said determining step. - When monitoring the frequency of activating the hydraulic pumps that are controlled by solenoids, is the purpose, there are a finite number of identified points to monitor to determine the frequency. It is obvious

to try these identified points to yield a predictable solution with a reasonable expectation for success.

Claim **20** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Bird in view of Hossfield as applied to claim 14 and further in view of U.S. Patent No. 4,374,423 to Kundler et al. (hereafter referred to as Kundler). Kundler is concerned with an arrangement for monitoring a rudder control system.

Regarding **claim 20**, which is dependent on claim 14, further including a repeatback signal rate of change detector for monitoring operation of said rudder drive system. - Bird does not teach monitoring the rate of change of the rudder feedback signal, but Kundler monitors it (abstract and col. 1 lines 62-66). It would have been obvious to one of ordinary skill in the art at the time of the invention to use Kundler's rudder monitor with Bird's marine steering system to make the operator aware of problem conditions more quickly.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 4,038,528 to Fowler for an automatic piloting system for automatic steering of a marine vessel; U.S. Patent No. 4,223,624 to Iyeta for a rudder control circuit for an automatic steering system; U.S. Patent No. 4,595,867 to Cognevich for a steering amplifier; U.S. Patent No. 5,034,895 to Johnson for an adaptive rudder order bias integrator; U.S. Patent No. 5,179,905 to Hossfield for an

adaptive autopilot and U.S. Patent No. 5,313,397 to Singh for an autopilot system for a vessel.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin B. Olsen whose telephone number is 571-272-9754. The examiner can normally be reached on Mon - Fri, 8:30 -5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LO

THOMAS BLACK
SUPERVISORY PATENT EXAMINER